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DRAWINGS ATTACHED

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(54) IMPROVEMENTS IN OR FOR SCREW-DRIVER ATTACHMENTS

(71) I, BENJAMIN EDWARD BOOTH, of 56 Rothesay Bay Road, North Shore, Auckland, New Zealand, a British subject and a New Zealand citizen, do hereby declare that

the invention, for which I pray that a Patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to screw driver attachments that when fitted to a screw driver will hold a screw firmly, under pressure, preparatory to its entrance into a work piece.

At present, known types of screw holding attachments have holding jaws in which the screw head is clamped and the screw driver is then engaged with the screw head ready for screwing into a work piece. Disadvantages of this type of arrangement are that the jaws have to be adjusted to take different sizes of screws and that the screw is held out from the body of the tool and cannot be subjected to the necessary pressure to enter a work piece until a hole is drilled or punched to provide a starting reception for its entry having carefully engaged the thread of the screw to allow it to remain in an upright position under extreme pressure from a normal screw driver.

The object of the present invention is to provide an attachment for combination with a screw driving device in which a screw can be held for screwing without having to adjust it to accommodate different sizes of screws.

A further object is to provide an attachment for combination with a screw driving device which clamps a screw and by so doing eliminates the necessity to have a drilled hole to guide the screw into a workpiece.

The invention consists of an attachment for combination with a screw-driving device, the attachment consisting of a tube having a slot located medially in its length and shaped to allow a screw to pass through the slot, one end of the tube formed or provided with a resilient means for holding a head of a screw and its other end formed or provided with means for slidably retaining the tube upon a shank of a screw driving device, the construction and arrangement being such that with the attachment mounted on the said shank and a screw head held within the tube by the resilient means the screw-driving device can be operated to force the screw from the tube into a wooden workpiece, the resilient means clasping the screw until forced sufficiently open by the screw for the said screw to be released from the tube.

In further describing the construction and function of the invention reference will be made hereinafter to the accompanying drawings in which:—

Figure 1 is a side view of a tube,

Figure 2 is a view of a part of means for holding a screw-head,

Figure 3 is a view of an internal part of a tube later referred to,

Figure 4 is a side view of an attachment,

Figure 5 is a view showing an attachment upon a screw-driving shank, holding a screw,

Figure 6 is a similar view to the last Figure, showing the screw driven into wood,

Figure 7 is a similar view showing the shank retracted,

Figure 8 is a similar view but showing the attachment located at the upper end of the screw-driver shank,

Figures 9—14 are similar views to Figures 1—7 but of a modified form of an attachment,

Figures 15—20 are similar views to Figures 1—7 but of another modified form of an attachment, Figure 16 including two views of a jaw member,

Figures 21—26 are similar views to Figures 1—7, but of another modified form of an attachment, Figure 22 including views of jaw members, and

Figures 27 and 28 are sectional side views of a yet further modified form of an attachment

In giving effect to the invention, in its preferred form, a screw holding tube A is formed

entirely of spring steel, or steel tempered at at least its ends. The tube is of a length sufficient to take range of screws of varying length and also provide for a proper guide for the shank *S* of a screw-driving device or screwdriver.

Slot B in the wall of the tube is located medially in its length and includes and enlarged end B^1 for the head of a screw S^1 and a main length B^{11} tapering down from the enlarged end B^1 to take the remaining length of the screw.

This length B^{11} can be extended into a slit opening, but preferably a separate slit opening C is provided at the screw-head holding end of the tube, which end can be gradually reduced in diameter so as to provide a restricted open end A^1 through which a screw-threaded portion of the screw will project.

From this restricted end A^1 the slit openings C extend up some distance so as to provide jaws D which will open when the head of the screw is forced out of the tube A by force applied on the other end of the screw-driver and then the slitted end of jaws D of the tube A will automatically close again due to the inherent flexibility of the tube A and the long slit openings C. The extremity of the lower end of the screw-holding tube can be formed with a rim (not shown) and a circlip E may be located on the tube above the rim to increase the closing strength of the jaws D.

The other, upper, end of the screw-holding tube has a bush F inserted in it to take the shank of a screw driver for which the attachment is designed. The jaws D frictionally slide upon the screw driver shank *S* and can engage into peripheral grooves *g* formed on such shank at positions such as to enable the attachment to be withdrawn up the screw driver shank into an inoperative position to allow for normal use of the screw driver.

The attachment is open to modifications. For instance, instead of the jaws D at the lower end of its tube A, this end can be substituted with resilient means for holding the screw head consisting of a ring or rings of metal balls G positioned inside side holes H and are held in place by a spring-loaded clip I or other retaining device. The other end of the screw holding tube can be provided with a similar arrangement of balls (not shown) for locking into grooves provided on the screw driver shank for operative and non-operative positions of the attachment.

A further modification is shown in Figure 14 where the attachment is associated with another tube J which is slidably mounted on the screw-holding tube A and a spring K is set in compression between the edge of the upper end of the screw-holding tube A and under a head of the screw-driving device, which in this case could be a power drill.

A yet further modification; see Figures 15—20 or 21—26, is where the tube has one end of which is adapted as to be able to accommodate a number of jaws L and resilient or spring clips or rings M for movably holding the jaws. The end is of a size that will allow a jaw L to move outwardly from the inside of the tube and thus leave the inside of the tube unhindered when a screw driver is passed through it. Behind each of these is placed the spring M so as to force the jaws back into the tube when an obstruction such as a screw driver shank *S* is withdrawn. These springs M also force the jaws against the screw S^1 when it is in place and so hold it firmly for screwing. By shaping the end differently the openings for the movable jaws may be allowed to continue out of the tube and the resilient means such as a spring or springs M incircling the tubular body can be used to keep the jaws movably mounted. The diameter of the inside of the tube is of such a size selected to allow any given sized screw driver shank to pass through the tubular body. The length of the body of the tool is such that when on the screw driver shank it is appreciably shorter than the length of the said shank; this allows the tube to be pushed up the shank and out of the way of the screw driver blade when not in use.

In use the screw-holding tube A is slid to its position upon the lower end of the shank *S* of the screw-driving device and the appropriate screw S^1 is placed in the now extended holding tube through the side hole B of that tube. The screw S^1 then slides down the tube A so that the screw head is caught by the spring jaws D or L or the self-centering balls G but with the screw-threaded portion of the screw S^1 projecting from the holding tube A.

Under normal pressure or under pressure placed on the top of the screw head by the shank *S* in normal screw driver action the screw S^1 is forced down the holding tube A its head stopped by the balls G or spring jaws D or L until it then forces the centering balls or jaws apart to allow the screw still under pressure to be completely driven home into a wooden material including a countersink if required. Once the screw is placed in the tube A on the screw driver the normal screw action of the driver is employed whether it be by hand or power, thus enabling the operator to use any length of screw driver and so reach into awkward places, that would be impossible under normal conditions such as recesses where he would be unable to reach by hand. This is due to the positive entry of the screw under pressure without the usual preparatory need to drill or punch a hole and enter the screw in the normal manner.

This invention thus enables any user to fix house fittings or home appliances without any previous experience as all that is necessary after the screw S^1 has been placed in the holding tube A on the screw driver is to press and twist the handle to ensure positive and correct entry of the screw thereby obviating

the danger of injury to fingers, which can otherwise occur when an amateur offers up a screw by hand and the screw collapses sideways under pressure of the screw driver whilst still being held by the operator.

When the attachment is used in conjunction with a normal screw driver on the shank or bit, it becomes a telescopic tool taking complete charge of the screw in the interior of the holding tube A requiring no preliminary hole and require only pressure and the normal twisting action to accurately fulfil its purpose. This application to all sizes and design of screws taken by the side hole of the holding chamber provides for greater confidence as pressure can be used with this tool since on no occasion is the screw in contact with the fingers and the operation is performed by one hand holding a screw driver or a power tool.

This tool can be used in conjunction with a standard screw driver, a hand brace-and-bit, a pressurised ratchet-twist screw driver, or any powered type of screw bit an overrunning clutch and reverse, all of which would work in perfect harmony with the attachment. Although power tools will very quickly twist a screw in the normal manner, their efficiency is greatly affected by having first to drill or punch a hole and enter the screw before screwing.

This invention also applies to cross-head screws and the cross-type bits which are also restricted in their efficiency by the same procedure of firstly having to drill or punch a hole in the wood to receive a screw. Using a suitable bit to fit hexagon-head twist nails, the attachment could provide an efficient method of fixing items such as roof tiles, battens, and many others, where one hand is required to offer up the item to be fixed leaving the other hand to completely control the fixing with a power tool and the attachment with the provision of an automatic feed attachment if so required. The slot B where a single screw is entered can be formed to receive and hold a clip, magazine N, or a plurality of screws formed as a roll tape.

WHAT I CLAIM IS:—

1. An attachment for combination with a screw-driving device, the attachment consisting of a tube having a slot located medially in its length and shaped to allow a screw to pass through the slot, one end of the tube formed or provided with a resilient means for holding a head of a screw and the other end of the tube formed or provided with means for slidably retaining the tube upon a shank of a screw-driving device, the construction and arrangement being such that with the attachment mounted on the said shank and a screw-head held within the tube by the resilient means, the screw-driving device can be operated to force the screw from the tube into a wooden workpiece, the resilient means clasping the screw until forced sufficiently open by the screw for the said screw to be released from the tube.

2. An attachment as claimed in claim 1 wherein the slot has an enlarged end to take the head of a screw, the length of the slot extending from such enlarged end being such as to take the remaining length of such screw.

3. An attachment as claimed in claim 2 wherein the screw-head holding end of the tube, is gradually reduced in diameter so as to provide a restricted opening end through which a screw-threaded portion of the screw will project.

4. An attachment as claimed in claim 3 wherein from this restricted end there are formed slit openings extending up a distance providing jaws which will open when the screw-head is forced out of the tube by force applied to the screw by the screw-driving device and then the jaws of the tube will automatically close again.

5. An attachment as claimed in claim 4 wherein the extremity of this lower end of the tube has a rim and a circlip is located on the tube behind the rim to increase the closing strength of the jaws.

6. An attachment as claimed in claim 5 wherein the other end of the tube has a bush in it to take the shank of the screw-driving device, the jaws being frictionally slidable upon the said shank and engageable in peripheral grooves formed on such shank at a position such as to enable the attachment to be withdrawn along the shank into an inoperative position to allow for normal use of the screw-driving device.

7. An attachment as claimed in claim 1 wherein the resilient means consists of a ring or rings of balls positioned inside side holes and a spring clip holding the balls in place.

8. An attachment as claimed in claim 7 wherein the retaining means consists of a similar arrangement of balls for locking into grooves provided on the said shank for operative and non-operative positions of the attachment.

9. An attachment as claimed in any preceding claim including a further tube slidably mounted on the screw-holding tube and a spring which is compressible between the edge of the other end of the screw-holding tube and a head of the screw driving device, the latter being a power-drill.

10. An attachment as claimed in claim 1 wherein said one end of the screw-holding tube is adapted so as to accommodate a number of jaws and resilient means for movably holding the jaws, said one end being of such a size as to allow a jaw to move inwards but to leave the inside of the tube clear when the shank is passed through it.

11. An attachment as claimed in any preceding claim and wherein the screw-holding tube is of a length much shorter than that of the

shank so that the tube may be pushed along the shank when not in use.

12. An attachment as claimed in any preceding claim and further including a clip or magazine for holding a plurality of screws wherein each screw can pass through the slot in the screw-holding tube individually.

13. An attachment for combination with a screw-driving device, the attachment being constructed, arranged and operable substantially as herein described with reference to and as shown in Figures 1—8, 9—14, 15—20, 21—26 or 27 and 28 of the accompanying drawings.

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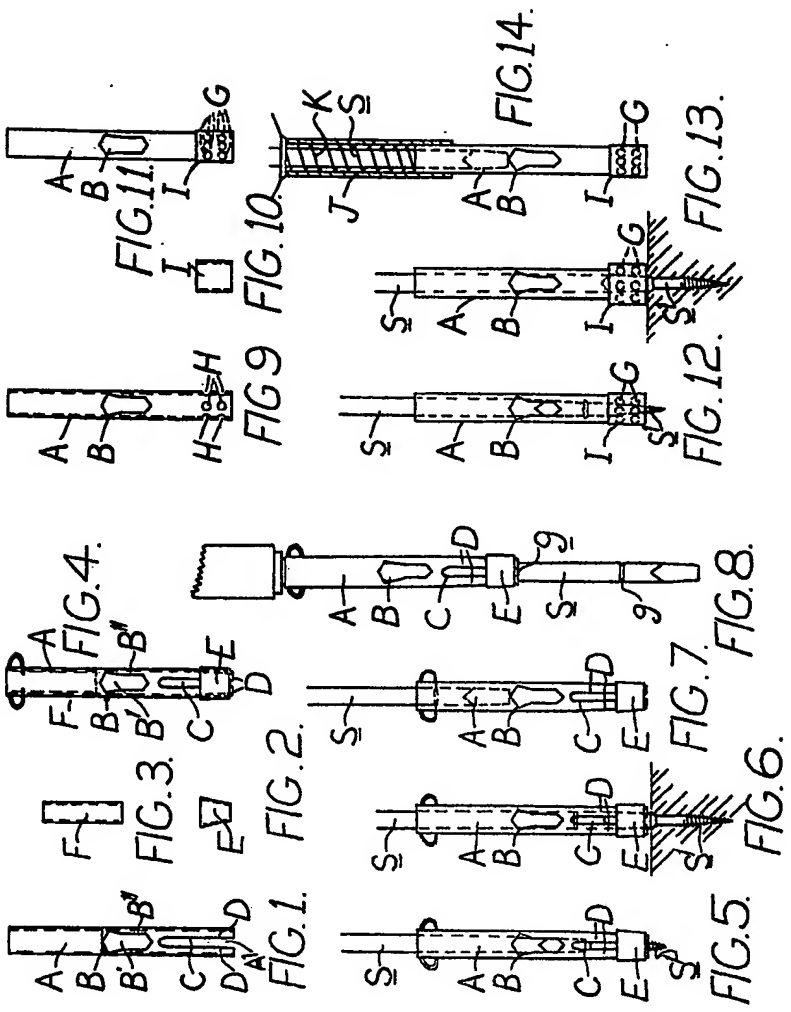
Sheet 1



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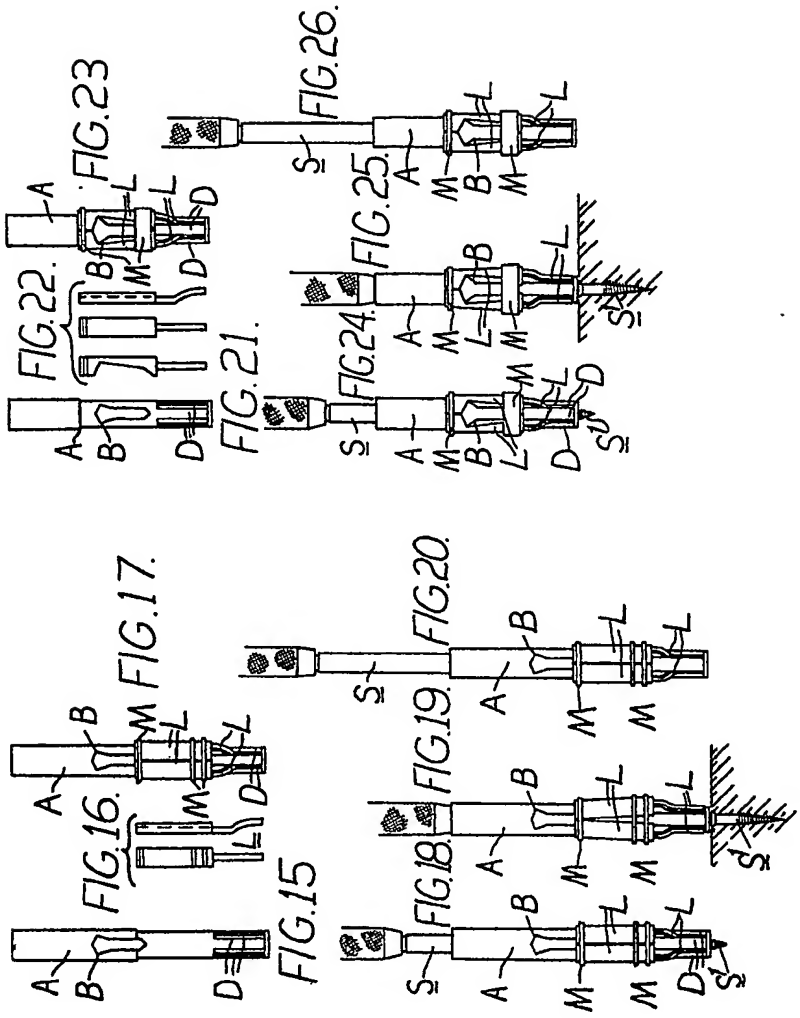

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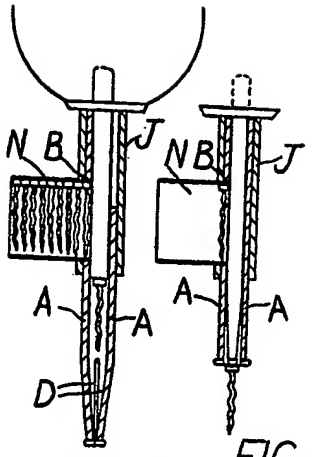

FIG. 27. FIG. 28.